

The Soufriere Hills Eruption, Montserrat, British West Indies: Introduction to Special Section, Part 1

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The families of Montserrat have endured substantial hardship and, for some, the terrible loss of family members and friends. They are joined by an uncommon love of their home island and have gained the respect and affection of their volcanologist visitors.

At the beginning of the Twentieth Century, largely because of two eruptions in the Caribbean, volcanology began its evolution into a modern, multidisciplinary science. The two volcanoes were Soufriere on St. Vincent and Mont Pelee on Martinique, where within a few days in 1902 explosive eruptions had killed about 30,000 people. The scientists sent to study the effects of the Caribbean eruptions recognised that the reactive, "expeditionary" approach to volcanology then in vogue was inadequate to solve the problems presented by such severe volcanic hazards, and that it was necessary to observe and measure the behaviour of volcanoes before and during eruptions, as well as after them, to learn how these volcanoes "worked" (1). Thus within a decade the first volcano observatories were established in Hawaii and Japan, and others followed later.

Now, as the Century draws to a close, the attention of volcanologists worldwide is again focused on the Caribbean. The Soufriere Hills volcano on the Lesser Antilles Emerald Isle of Montserrat has been erupting for three years. The hazard management problems have been severe, leading to massive evacuations, much hardship, and economic distress. Montserrat is a small island, and the hazards there are hard to avoid, have grown in severity with time, and have proven exceptionally diverse. They range from cristobalite-bearing ash to roof-shattering, meter-scale ballistic clasts, from lava dome collapses that produce pyroclastic flows, to sector collapse avalanches capable of triggering directed blasts and generating tsunamis. Vulcanian eruptions have exploded skyward, often with remarkable regularity, and pyroclastic flows generated by fountain collapse have poured down radial drainages. Through all this the volcano has been closely watched and monitored, with the phantom of St. Pierre on Martinique, the Pompeii of modern times, imbedded uncomfortably in the collective memory of the decision makers and the scientists providing guidance to the authorities and citizens of the island.

Since the onset of eruptive activity, Soufriere Hills has become one of the most closely monitored volcanoes in the world. A Montserrat Volcano Observatory (MVO) has been established, with staff drawn primarily from the Seismic Research Unit of the University of the West Indies in Trinidad, the UK university volcanological community, and the British Geological Survey. Critical assistance has been provided by the U.S. Geological Survey, the French CNRS, and a number of volcanologists from academic institutions around the world, as well as by Montserratians. The main foci of the observatory operation comprises seismic, deformation, and gas monitoring, along with visual observations, with helicopter support providing access to crucial locations. As a result of this work, the lessons being learned on Montserrat, and the new techniques being developed, are making this andesitic eruption one of historic importance to volcano science. Hopefully progress is also being made in applying these advances to the reduction of

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Paper number 98GL02438.
0094-8534/98/98GL-02438\$05.00

human suffering, and some of these lessons might be applied to dangerous volcanoes elsewhere.

This issue of the Geophysical Research Letters presents for the first time a collection of papers devoted to the scientific results obtained from study of the Soufriere Hills eruption. This issue contains Part 1 of the special section and begins with an overview of the geology of the eruption, with following contributions grouped in topical categories: seismicity of the volcanic system, ground deformation, the eruptions and related phenomena, and petrology. Part 2 of the special section will be published in a forthcoming issue of GRL. All papers have been improved as a result of thorough technical reviews, and we thank our colleagues for these reviews. Our thanks also go to Carl Agee who worked on this collection for GRL and made our task much easier.

The work on Montserrat has needed the cooperation and collaboration of large numbers of people. Foremost, all scientists involved will wish to recognise the contributions of the local staff of MVO. Since the eruption began, Montserrat staff have developed the necessary skills and showed the outstanding dedication that were essential for a successful observatory and for supporting the scientific effort. The considerable contributions of Venus Bass, Levar Cabey, Thomas Christopher, Billy Darroux, Leroy Luke, Pops Morris, Karney Osborne, David Patch Silcott, George Skerit, Tappy Syers, and Dave Williams are acknowledged. The brave and highly skilled helicopter pilots, notably Jim McMahon and Alex Grouchy, made major contributions in allowing work close to the dome and in safety. The scientists' work has been facilitated by the support of two Governors, HE Frank Savage and HE Tony Abbott, by three Chief Ministers, Reuben Meade, Bertrand Osborne and David Brandt, and by Frankie Michael, Permanent Secretary of the Emergency Department. Numerous people and organisations in all parts of Montserrat society have helped the MVO, including the police force led by Frank Hooper, the Royal Montserrat Defense Force, radio ZJB, the Government Information Service, the Aid Management Office of DfID, the Governor's Office, ministers of Government of Montserrat, and, not least, the people of Montserrat. The financial support for the scientific work has mainly come from the Department of International Development of the UK Government and the Government of Montserrat. This support has been necessarily substantial and generous.

Reference

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(Received July 22, 1998; accepted July 22, 1998.)